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ANALYSIS OF PERCEIVED FINANCIAL CONDITIONS OF US NAVY ENLISTED PERSONNEL

by

Steven M. Milinkovich

March 2006

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This study evaluates demographic and attitudinal characteristics that explain variations in perceived financial condition (PFC) of Navy enlisted personnel using data from the *1999 Department of Defense (DoD) Survey of Active Duty Personnel* (ADS). The ADS includes questions about: background information, economic issues, family information, programs and services, military life, career information, and assignment information. Two ordinal logistic regression models were estimated and used to explain variations in the PFC levels of married and single marital status samples of 2,362 and 1,309 U.S. Navy enlisted personnel, respectively. Results provide evidence that PFC levels are significantly affected by dependents, job satisfaction, household residence type, race/ethnicity, time away from homeport (married only), education (single only), paygrade, age, and pecuniary characteristics (gross income, savings, unsecured debt). Further study is recommended to incorporate PFCs into cost estimates addressing the full impact of financial problems. Additional study is also recommended to refine demographic profiles in targeting persons who may benefit most from financial counseling, military housing, and DoD college programs.

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ANALYSIS OF PERCEIVED FINANCIAL CONDITIONS OF U.S. NAVY ENLISTED PERSONNEL

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This study evaluates demographic and attitudinal characteristics that explain variations in perceived financial condition (PFC) of Navy enlisted personnel using data from the *1999 Department of Defense (DoD) Survey of Active Duty Personnel* (ADS). The ADS includes questions about: background information, economic issues, family information, programs and services, military life, career information, and assignment information. Two ordinal logistic regression models were estimated and used to explain variations in the PFC levels of married and single marital status samples of 2,362 and 1,309 U.S. Navy enlisted personnel, respectively. Results provide evidence that PFC levels are significantly affected by dependents, job satisfaction, household residence type, race/ethnicity, time away from homeport (married only), education (single only), paygrade, age, and pecuniary characteristics (gross income, savings, unsecured debt). Further study is recommended to incorporate PFCs into cost estimates addressing the full impact of financial problems. Additional study is also recommended to refine demographic profiles in targeting persons who may benefit most from financial counseling, military housing, and DoD college programs.

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I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

The Navy strives to provide counseling and training to help individuals plan, manage, and spend their earnings in a manner that best avoids financial problems. Administrative procedures were in place to handle objectively-defined financial problems. A financial problem, such as being pressured by a creditor, may affect operational readiness when it results in the processing of a garnishment, letter of indebtedness, revoked security clearance, or other administrative action. Person-hours spent correcting such financial problems could be otherwise allocated to primary mission areas.

Equally important is whether or not a person perceives that he or she has a problem. Individual concerns and stress may directly affect work performance and family relationships.[1] The Navy would get a more accurate picture of the true costs of financial problems on force readiness if the effects of perceived financial conditions (PFCs) could be evaluated.

B. BACKGROUND

Personal Financial Management (PFM) is a top concern of Navy families and Navy leadership.[2] Despite receiving PFM training, service members continue to report financial problems. Across the Department of Defense (DoD), nearly

1 R. Buddin, D. Phuong Do, Assessing Personal Financial Problems of Junior Enlisted Personnel, (Santa Monica, California: RAND, MR-1444-OSD, 2002), 11.

2 G. L. Hoewing, Personal Financial Management Education, Training, and Counseling Program, (OPNAVINST 1740.5A CH-1, March 1, 2005), 2.

one-quarter of junior enlisted personnel classify their financial situation as either "in over their head" or "tough to make ends meet." Survey results in 1997 and 1999 indicated that 22 percent and 24 percent, respectively, fell within these two categories.[3,4] Concerns should not be confined exclusively to junior enlisted personnel. Navy Personnel Research and Development Center (NPRDC) survey data, collected in 1994, indicated that 28 percent of service members in the ranks of E-4 to E-9 have reported that financial concerns affect their operational readiness.[5] Subsequent surveys and reports specific to senior enlisted ranks were not available.

The Navy experiences direct costs from personal financial mismanagement problems. In 1998, A Marywood University study estimated that the Navy lost an estimated $101 million from personal financial management problems. Costs were attributed to decreased productivity, failed re-enlistments, and lost security clearances.[6] In 2002, the Navy reported to Congress a higher estimate of $250 million in lost productivity and salary from personal financial management problems.[7]

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3 P. Tiemeyer, C. Wardynski, R. Buddin, Financial Management Problems among Enlisted Personnel, (Santa Monica, California: RAND, DB241, 1999), 5.

4 R. Buddin, D. Phuong Do, 11.

5 R. Luther, I. Leech, T. Garman, "The Employers Cost for the Personal Financial Management Difficulties of Workers: Evidence from the U.S. Navy," *Personal Finances and Worker Productivity*, Vol. 2, No. 1, 1998, 175.

6 R. Luther, I. Leech, T. Garman, 175.

7 D. Stewart, Military Personnel: More DoD Actions Needed to Address Servicemembers' Personal Financial Management Issues, (Washington DC: GAO-05-348, April 26, 2005), 1.

According to RAND, military personnel experience substantially more financial problems than comparable civilians. In 2002, RAND reported a 10-percent higher incidence for junior enlisted personnel being pressured by creditors and an 8-percent higher incidence of paying bills late when compared with civilians.[8]

This higher incidence of financial problems among military personnel can be attributed to the differences between military and civilian life. For example, service members are typically younger and more financially independent from parents as compared with civilians. Service members also tend to marry earlier and set up a traditional household where spouses work part-time or not at all.[9] Service members have a limited role in choosing where they live, when they move, and when they deploy. Finally, military life tends to add other unique stressors across many different combinations of demographic profiles.[10]

The primary goal of this research was to identify and examine the demographic and attitudinal characteristics that affected the subjectively (personally) assessed personal financial condition of Navy enlisted personnel. In doing so, the study used data from the *1999 DoD Survey of Active Duty Personnel* (ADS).

C. LITERATURE REVIEW

The ability of any organization to accomplish its mission effectively is tied directly to its effectiveness

8 R. Buddin, D. Phuong Do, xiii.

9 P. Tiemeyer, C. Wardynski, R. Buddin, 11.

10 P. Tiemeyer, C. Wardynski, R. Buddin, 11.

in leveraging capital assets. Human capital is one such asset fundamental to any organization. Human capital is both recruited and developed with the explicit intent of harnessing it to meet an organization's mission. Personal financial condition is a particular element of human capital. The Navy addresses this by making it a subcomponent of the personal development vector of the Navy Five Vector Model.[11] Categorizing personal financial condition as a subcomponent of personal development represents an important step in justifying naval research to identify factors that affect it and its derivative forms.

1. Civilian Studies

Joo and Garman[12] examined the relationship between personal financial wellness and absenteeism. A survey of white collar clerical workers was administered, resulting in 278 usable responses. Correlation and regression analysis were performed to examine relationships between personal financial wellness, demographic characteristics, and absenteeism. Traditional demographic variables such as age, sex, or marital status were not significantly correlated with absenteeism. Rather, absenteeism occurred with higher frequency among personnel who had stressful financial problems. Even higher absenteeism was found among those experiencing these stressful situations when coupled with a poor financial solvency status (high debt

11 K. J. Moran, "Interview with Vice Adm. J. Kevin Moran," CHIPS Magazine, July-September 2005.

12 S. Joo, E. T. Garman, "Personal Financial Wellness May be the Missing Factor in Understanding and Reducing Worker Absenteeism," Personal Finances and Worker Productivity, Vol. 2, No. 2, November 1998, 172-182.

vs. savings). Extrapolation of results to clerical workers throughout the United States shows a potential annual net savings of $440 million, if clerical workers were both educated on financial matters and modified their financial behaviors.

Porter and Garman[13] conceptualized a model that explained financial well-being by personal characteristics, objective attributes, perceived attributes, and evaluated attributes of the financial domain. The dependent variable, financial well-being, was measured using an 11-point, self-anchoring scale. The worst possible financial situation was characterized by a response of "one," while the best possible financial situation received a response of "eleven."

Porter and Garman validated the use of their single-item indicator, financial well-being, through a meta-analysis of research on one and two variable methods of measuring satisfaction. Regression analysis indicated that a consolidated index of fourteen subjectively-defined variables was statistically significant at all levels and had the greatest explanatory power for defining financial well-being. Results also indicated that the consolidated index of objectively defined variables was statistically significant at the one-percent level and significantly explained the variance in financial well-being. However, not a single variable taken from the objective variables index emerged independently as a significant predictor of financial well-being at the five-percent level.

13 N. M. Porter, E. T. Garman, "Testing a Conceptual Model of Financial Well-Being," Financial Counseling and Planning, Vol. 4, 1993, 133-165.

2. Military Studies

Luther, Leech, and Garman[14] monetized the impact of personal financial problems within the Navy. Their research found that the Navy experienced $35.8 million in annual productivity losses due to hours lost processing letters of indebtedness, bad checks, garnishments, and time spent obtaining Navy-Marine Corps Relief Society assistance. Finally, their research also showed that an additional $65.2 million in costs occurred through related failures to re-enlist and lost security clearances.

Stewart[15] reported to Congress the major flaws with the existing structure for PFM training and provided recommendations for improving PFM training. His report also included results of a 2003 DoD survey. Survey results for the financial condition of deployed and non-deployed service members were generalized as "similar" to each other. Deployments were characterized as periods of thirty or more days away from home base. A subjective variable, called personal financial condition, was constructed via measuring frequency of response to each of five choices: 1) in over your head; 2) tough to make ends meet; 3) occasionally have some difficulty making ends meet; 4) able to make ends meet without much difficulty; and 5) very comfortable and secure. Deployed personnel were under-represented by one to two percent in each of the most-financially-secure categories and over-represented by one percent in each of the two least-financially-secure categories. Finally, objective variables for being

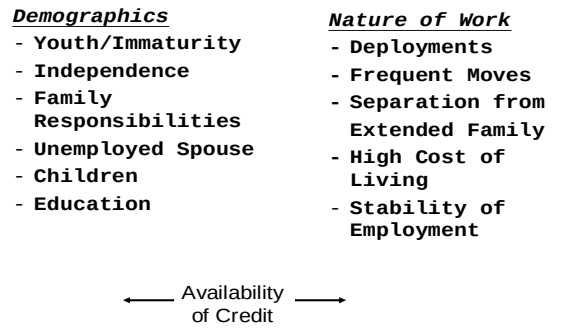
14 R. Luther, I. Leech, T. Garman, 175-182.

15 D. Stewart, 1-60.

pressured by creditors, paying bills late, and bouncing checks were found to occur at two-to-four percent higher frequency among deployed personnel.

Tiemeyer, Wardynski, and Buddin[16] described the financial well-being of enlisted personnel. RAND survey data from 1997 were analyzed to report the extent of personal financial problems throughout all branches of the military. Finally, the characteristics of both military service and military environment were seen as factors that may place enlisted personnel at increased risk for financial problems (Table 1).

Table 1. Factors That Place Enlisted Personnel at Risk for Financial Problems



(Source: Tiemeyer, Wardynski, and Buddin, 11)

Survey results indicated that Navy personnel were the second-least-likely among members of the four services to have personal financial problems, at 28 percent of those surveyed reporting financial problems. Air Force personnel experienced the fewest problems, at 22 percent, while Marine Corps and Army personnel experienced rates of 31 and 33 percent, respectively.

16 P. Tiemeyer, C. Wardynski, R. Buddin, 2-23.

Buddin and Do[17] conducted focus-group interviews and used three surveys: ADS, *RAND 1997 Enlisted Career Intentions (ECI) Survey,* and the *1996 Panel Study of Income Dynamics (PSID)*. The PSID served as a source of data on civilians. Research was directed at studying the personal financial condition of first-term enlisted personnel. Regression models for objectively defined dependent variables were developed for a comparative analysis of military vs. civilian financial conditions.

Buddin and Do determined that military members had a much higher probability of bill-paying problems than do civilians, at 27 percent versus 18 percent, respectively. Additionally, the authors estimated that only 10 percent of comparable civilians had been pressured by bill collectors, as compared with 23 percent and 18 percent of military members in 1997 and 1999, respectively.

Demographic variables were found to affect both civilian and military members in the same way. Creditor and bill-paying problems decreased with higher ages and levels of education. Additionally, blacks were found to have a higher incidence of problems as compared with Hispanics and white non-Hispanics. These results suggest that military efforts to reduce financial problems met with limited success. A subsequent report[18] by the General Accounting Office (GAO) supported this finding.

Buddin and Do found that deployments, long hours, and family separation were common within the military and all contributed to the financial problems of service members.

17 R. Buddin, D. Phuong Do, xi-xv.

18 D. Stewart, 2.

Two key insights were gained from this study. First, financial problems were not any more common for members who live in off-base housing. Second, household income at all levels below $3,000/month had no discernable effect on reports of financial problems. Rather, financial problems arose more often from spending patterns and management skills than from income levels.[19]

D. CHAPTER SUMMARY

The Navy strives to provide counseling and training to help individuals plan, manage, and spend their earnings in a manner that best avoids financial problems. In 1997 and 1999, DoD surveys indicated that 22 percent and 24 percent, respectively, of junior enlisted personnel reported their perceived financial condition (PFC) as either “in over their head” or “tough to make ends meet.” A 1994 survey indicated that 28 percent of service members in the ranks of E-4 to E-9 have reported that financial concerns affect their operational readiness.

In 1998 and 2002, the Navy lost an estimated $101 million and $250 million, respectively, from personal financial management problems (different sources). Literature review provided details of civilian and military studies that further developed relationships between various demographic and attitudinal characteristics to explain variation in PFC. The next chapter introduces the data used and provides a preliminary analysis of PFC versus demographic and attitudinal characteristics.

[19] R. Buddin, D. Phuong Do, xiii.

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II. DATA, SAMPLES, AND PRELIMINARY DATA ANALYSIS

A. DATA

The Defense Manpower Data Center (DMDC) has administered surveys of active-duty personnel once every seven years dating back to 1978. The surveys are important in that they complement routinely collected administrative data. DoD administrators can also use surveys to assist the DoD policy analysis and planning process.

DMDC administered the *1999 DoD Survey of Active Duty Personnel* (ADS) at the direction of the Deputy Assistant Secretary of Defense for Military Personnel Policy (ODASD [MPP]). This survey was administered to a non-proportional, stratified, single-stage random sample of 66,040 DoD Service members from the four armed services and the Coast Guard. Longitudinal sampling does not occur and precludes direct trend analysis. However, other surveys can be compared to identify trends.

The survey sample included personnel who had reached a minimum of six months of active-duty service in May 1999. Generals and admirals were excluded due to their small number and the inability to assure data confidentiality.[20] Surveys were administered between August 1999 and December 1999. A 51-percent weighted response rate was achieved with 33,189 usable surveys being returned.

The survey included questions grouped into several broad categories: background information, economic issues, family information, programs and services, military life,

20 L. Wright, K. Williams, E. Willis, 1999 DoD Survey of Active Duty Personnel: Administration, Datasets, and Codebook, DMDC Report No. 2000-005, December 2000, 4.

career information, and assignment information. Some survey questions include the ability to answer with any of a range of continuous values. For instance, five questions collected continuous values in units of years, hours, and dollars expended. However, most survey questions required the respondent to select from a series of discrete answers or from ranges of values.

The economic issues and background information sections included survey questions that are most intuitively related to perceived financial condition (PFC). Questions seek responses on items such as household savings, paygrade, and years of service. Additional questions on payments toward unsecured debt, housing, and household income allowed for data analysis on a cash-flow-related basis.

Buddin and Do[21] concluded that the ADS categorical household income groups were chosen poorly. Groups partitioned by one-thousand-dollar-per-month increments resulted in 81 percent of junior enlisted personnel falling within two brackets. These large brackets collapsed the variance in income and increased the difficulty in determining whether income levels affected financial problems. A continuous measure of household income would enhance both the quality of the household income variable and related analysis.

B. SAMPLE

Data from the *ADS* were limited to an exclusively enlisted Navy sample that answered question number 95 about

21 R. Buddin, D. Phuong Do, 18.

PFC. The resulting sample contained 3,855 survey responses. General sample demographics are presented in Table 2.

Gender, paygrade, and marital composition characteristics were all within less than one-half of one percent of those reported for the overall Navy sample in the *ADS* codebook. Slight variation in sample sizes and percentages can be expected since: the *ADS* codebook presents marital and gender composition numbers based on combined officer and enlisted data; and the samples presented in the *ADS* codebook were likely filtered to exclude responses that were otherwise useful in this research.

Table 2. Sample Demographics

Selected Variable	Percent of Sample
Male	85.9
Female	14.1
E1-E3	11.3
E4-E6	70.6
E7-E9	17.4
Married	64.3
Single	35.7

(Source: 1999 DoD Survey of Active Duty Personnel)

C. PRELIMINARY DATA ANALYSIS

Analysis of the sample yielded a wide range of independent variables that were statistically significant in their relationship with enlisted PFC. Statistically significant relationships were established through chi-square tests. The *ADS* survey response on PFC can effectively be categorized into worst-tier situations where personnel report themselves as either “in over my head” or

"tough making ends meet." The best tier included personnel reporting that they were "able to make ends meet without much difficulty" or "comfortable and secure." Personnel who did not fall into either of these tiers reported themselves as having "occasional difficulties."

The sample average for worst and best tiers was 19.6 percent and 51.2 percent, respectively. This means that 19.6 percent of the sample classified their perceived financial situation as either "in over my head" or "tough to make ends meet." The sample average for personnel reporting their perceived financial situation in the worst tier was comparable with RAND results for DoD. RAND found that a DoD sample of service members with ten years or less of service had a 24-percent frequency in the worst-tier.[22] Intuitively, a lower worst-tier frequency of 19.6 percent was reasonable since research here includes personnel in higher pay grades and, arguably, with more experience handling personal finances.

A chi-square test indicated that a history of prior financial problems was statistically significant at all levels for explaining variance in PFC. Personnel reporting the occurrence of a significant financial problem within the past twelve months were 93.6 percent more likely to be in the worst tier. Serious financial problems generally included command notification by creditors, bounced checks, utility shut off, or other inabilities to pay bills. This suggested that it is important for supervisors to schedule follow-up counseling sessions with personnel who experienced significant financial problems within the

22 R. Buddin, D. Phuong Do, xii.

previous year. Follow-up counseling sessions could help increase the likelihood that sound financial practices were understood and actively implemented.

Other interesting sample distributions occurred for general characteristics that include residency type, time away from duty station, occupation, age, and education versus PFC. A chi-square test indicated that residence type was statistically significant at all levels for explaining variance in PFC. Personnel assigned to military housing had no significant benefit in perceived financial situation outcomes when compared with those living in civilian housing. The difference between these two groups reflected only a 1.7 percent difference in likelihood of being in the worst PFC tier. RAND found similar results for housing type based on a different financially-defined dependent variable.[23] This suggests DoD policy planners should not emphasize any financial benefits of military housing for service members when determining related annual expenditures. Instead, emphasis should be placed on other non-pecuniary benefits.

The *ADS* classified time spent away from duty station in seven categories. For this analysis, survey responses for periods of seven-to-ten months and ten-to-twelve months were consolidated into one period of seven-to-twelve months. The resulting distribution of time away from homeport versus PFC implied a semi-sinusoidal relationship. A chi-square test indicated that a member's twelve-month history of time away from homeport was statistically significant at the 0.009 level for explaining variance in

23 R. Buddin, D. Phuong Do, xiv-xv.

PFC. Personnel spending one-to-thirty days away from homeport or three-to-five months away had a 23.8 percent and 17.3 percent less likelihood, respectively, for falling in the worst PFC tier. This may be explained by the semi-permanent nature of being away from homeport. Personnel spending less than thirty days away may either qualify for sea duty pay or per-diem reimbursement while concurrently being in a situation where typical credit accounts and billing cycles can be managed as-is. Personnel spending five-to-seven months away from homeport may enjoy a lower likelihood of being in the worst tier since time spent away could be considered moderate relative to the extreme of seven-to-twelve months away and likely includes reasonable compensation (per-diem, sea pay, family separation pay, etc.) relative to time spent away from homeport.

A chi-square test indicated that satisfaction with occupational specialty assigned at enlistment was statistically significant at all levels for explaining variance in PFC. Personnel reporting that they were dissatisfied with their occupation were one of the sample groups most likely to be in the worst PFC tier. Personnel in this category were 51.2 percent more likely than the sample average to be in the worst PFC tier. Only personnel who reported a significant problem occurring within the last twelve months, or personnel with more than $20 thousand in unsecured debt, were more likely to be in the worst PFC tier. This was the most startling finding.

A chi-square test indicated that a member’s age was statistically significant at the 0.0004 level for explaining variance in PFC. Analysis of age versus PFC

yielded counterintuitive results. The relationship between age and PFC implied a parabolic relationship. Personnel who were either in their teenage years or over forty years old (“forty-something”) had the lowest likelihood of being in the worst PFC tier. Teenagers and forty-something personnel were 18.8 percent and 13.9 percent, respectively, less likely than the sample average to be in the worst PFC tier. In this situation, teenagers could perhaps be construed as more ignorant of the adverse effects of poor money management and therefore less likely to recognize problems or feel stressed when confronted with adverse financial situations.

Finally, education implied a negative curvilinear relationship with PFC. A chi-square test indicated that education was statistically significant at the 0.0003 level for explaining variance in PFC. General characteristics versus PFC are listed in Table 3 for the situations noted above. Sample distributions for marital status and pecuniary characteristics versus PFC are depicted in Tables 4 and 5, respectively. Tables 3 through 5 have highlighted values that specifically represent compositions worse than the corresponding overall sample average.

Table 3. Perceived Financial Status of Service Members by General Characteristics

Variable(Chi-Sq. Sign. Level)	In over head (%)	Tough making ends meet (%)	Occasional difficulties (%)	Meets ends without much difficulty (%)	Comfortable and secure (%)
Overall Average	2.8	16.8	29.2	40.6	10.5
Finance Problem Reported Last Twelve Months (<0.001)	6.8	31.2	39.7	19.6	2.6
SAT w/ OCCUP. Received When Enlisted(<.0001)					
Yes	2.0	13.7	28.9	43.9	11.6
No	5.5	24.2	29.1	32.8	8.5
Gender(0.0157)					
Male	2.7	17.3	29.2	40.9	10.0
Female	3.9	13.9	29.5	38.9	13.8
Paygrade (<.0001)					
E1-E3	3.9	19.9	29.5	33.4	13.3
E4-E6	3.0	17.7	30.4	39.6	9.3
E7-E9	1.5	11.4	24.1	49.3	13.8
Age (.0004)					
Teenager	3.7	12.3	25.2	44.8	14.1
Twenty-something	3.2	18.3	30.3	37.3	10.9
Thirty-something	2.4	16.4	29.5	42.6	7.9
Forty_Plus	2.6	14.3	25.7	44.5	12.9
Residence Type (<.0001)					
Aboard ship	3.3	18.1	24.6	38.8	15.1
Barracks/Dorm	1.9	11.6	27.8	41.8	16.9
Military Housing	2.1	17.3	29.4	42.6	8.5
Civilian Housing (Rental and Owned)	3.2	16.6	29.6	41.2	9.5
Overall Average	2.8	16.8	29.2	40.6	10.5
Time Away From Duty Station Last Yr(.0090)					
None	2.7	16.9	26.7	41.9	11.8
< 1 month	0.5	14.5	32.6	40.6	9.1

Variable(Chi-Sq. Sign. Level)	In over head (%)	Tough making ends meet (%)	Occasional difficulties (%)	Meets ends without much difficulty (%)	Comfortable and secure (%)
1 to 3 months	3.8	19.4	32.3	36.3	8.1
3 to 5 months	1.5	21.0	25.1	43.0	9.4
5 to 7 months	3.0	13.3	31.9	40.1	11.8
7 to 12 months	2.9	17.2	30.5	40.4	9.0
SVC MBR Education(.0003)					
Non-High School Grad	3.2	18.0	29.8	38.9	10.2
High School Grad	2.9	16.5	30.3	42.1	8.3
Some College	1.5	13.7	26.7	42.9	15.1
Associates Degree	2.5	12.5	12.5	55.0	17.5

(Source: 1999 DoD Survey of Active Duty Personnel)

Sixty-four percent of the sample included married personnel. Chi-square tests indicated that marital status, spousal education, and spousal employment were each statistically significant at all levels for explaining variance in PFC. The effects of education of the spouse on PFC were far more pronounced than was the effect of education on the active duty member. Personnel married to a spouse without either a high school diploma or equivalency were 29.2 percent more likely than the sample average to be in the worst PFC tier. Personnel married to a spouse with an Associate's degree were 28.9 percent less likely to be in the worst PFC tier. Overall, the effect of spousal education on PFC implied a negative curvilinear relationship. The likelihood decreased with diminishing returns as a spouse becomes more educated.

Other spousal and dependent characteristics had a material impact on PFC. Personnel with a non-employed spouse were 37.4 percent more likely to be in the worst PFC

tier. Personnel who were single with dependents were 27.7 percent more likely than the sample average to be in the worst PFC tier. These results were not surprising, since non-employed spouses and other dependents represented increased liabilities. Households with non-employed spouses were unable to realize economies of scale with household expenses. Additionally, single personnel with dependents faced increased difficulty managing dependency care while assigned away from homeport.

Table 4. Perceived Financial Status of Service Members by Marital Characteristics

Variable (Chi-Sq. Sign. Level)	In over head (%)	Tough making ends meet (%)	Occasional difficulties (%)	Meets ends without much difficulty (%)	Comfortable and secure (%)
Overall Average	2.8	16.8	29.2	40.6	10.5
Family Status (<.0001)					
Married With Dependents	3.1	19.2	30.7	39.6	7.4
Married No Dependents	1.7	14.0	29.1	43.9	11.3
Single No Dependents	2.4	13.1	26.4	41.2	17.0
Single w/ Dependents	5.0	20.1	29.0	39.6	6.3
Spouse Work Status(<.0001)					
Employed	2.4	15.0	30.0	43.2	9.4
Not Employed	3.3	23.7	29.9	36.1	7.1
Spouse Education(<.0001)					
Not High School Grad	2.6	22.7	31.1	37.4	6.1
High School Grad	3.5	15.1	30.6	40.7	10.1
Associates' Degree	1.0	13.0	25.00	51.0	10.1
Bachelors' & Higher	1.9	11.3	24.5	37.7	24.5

(Source: 1999 DoD Survey of Active Duty Personnel)

The most intuitive factors affecting PFC were explicitly pecuniary characteristics. Table 5 presents a summary of PFC distributions for the household gross monthly income, total savings, and total unsecured debt independent variables.

Chi-square tests indicated that unsecured debt, household income, and net savings were each statistically significant at all levels for explaining variance in PFC. Total household unsecured debt implied an adverse relationship with PFC. As debt increases, the likelihood of being in the worst PFC tier increased. Total household savings had a negative curvilinear relationship with PFC. As household savings increase, the likelihood of being in the worst PFC tier decreased with diminishing returns.

Household monthly gross income had a clear effect on PFC when monthly gross income was less than $3,000. The relationship between household monthly gross income and PFC was best summarized as a negative curvilinear relationship with rapidly decreasing returns between incomes of $3,000 and $5,000. Households with $1,000 to $2,000 of household income were 24.7 percent more likely than the sample average to be in the worst PFC tier. Personnel with income between $2,000 and $3,000 were 17.4 percent more likely than the sample average to be in the worst PFC tier. Examination of household gross incomes above $4,000 shows significant improvement in PFC. Personnel with $4,000 to $5,000 in household income were 44.6 percent less likely to be in the worst PFC tier. However, improvements in PFC status diminished rapidly above household incomes of $5,000.

This conflicts with findings reported by Buddin and Do. As the author states:

> Financial problems are not related to family income. Higher military pay would improve the well-being of members and their families, but our results suggest that pay increase would do little to reduce the extent of financial problems among members. This finding suggests that financial problems are shaped by spending patterns and management skills rather than by the level of income.[24]

These findings were counter-intuitive and could be related to a different approach in applying or interpreting the dependent financial variables of "being pressured by creditors" and "paying bills late."

Table 5. Perceived Financial Status of Service Members by Economic Characteristics

Variable(ChiSq Sig. Level)	In over head (%)	Tough making ends meet (%)	Occasional difficulties (%)	Meets ends without much difficulty (%)	Comfortable and secure (%)
Overall Average	2.8	16.8	29.2	40.6	10.5
Total Unsecured Debt (<.0001)					
None-$5k	1.3	14.3	26.2	43.7	14.4
$5,001-$10k	3.7	16.7	32.5	41.6	5.6
$10,001-$20k	4.8	23.7	35.9	31.8	3.8
$20,001 and up	9.7	26.6	32.7	27.8	3.2
Household Gross Monthly Income(<.0001)					
$1-$2,000	3.8	20.8	29.5	34.4	11.6
$2,001-$3k	3.1	20.0	30.4	39.6	7.1
$3,001-$4k	2.0	17.0	31.9	40.3	8.9
$4,001-$5k	2.0	8.9	26.3	52.4	10.4
$5,001-$6k	2.0	6.5	17.7	54.9	19.0

24 R. Buddin, D. Phuong Do, xv.

Variable(ChiSq Sig. Level)	In over head (%)	Tough making ends meet (%)	Occasional difficulties (%)	Meets ends without much difficulty (%)	Comfortable and secure (%)
$6,001 and up	2.3	8.2	27.6	42.4	18.8
Overall Average	2.8	16.8	29.2	40.6	10.5
Savings Level (<.0001)					
$0-$5k	3.8	21.8	33.6	35.1	5.8
$5,001-$10k	<0.1	4.8	24.0	53.4	17.3
$10,001-$20k	<0.1	4.7	19. 7	59.7	15.7
$20,001-$50k	0.0	6.2	13.0	51.3	29.5
$50,001 and up	0.0	1.4	7.2	46.0	45.3

(Source: *1999 DoD Survey of Active Duty Personnel*)

D. CHAPTER SUMMARY

This study used the *1999 DoD Survey of Active Duty Personnel* (ADS). The ADS is administered to all services and Coast Guard once every seven years. It includes questions grouped into several broad categories: background information, economic issues, family information, programs and services, military life, career information, and assignment information.

Responses from the ADS were used to examine various demographic and attitudinal characteristics to identify those that were statistically significant in explaining variations in PFC. Existing literature on PFCs is discussed and applied in developing hypothesized relationships between PFC and various explanatory variables. The next chapter introduces the ordinal logistic regression (OLR) models used and the hypothesized relationships between PFC and selected explanatory variables.

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III. MODELS

A. THEORETICAL MODEL

Obviously, perceived financial condition (PFC) is unique for each person. Individual frameworks for reviewing information, internalizing decisions, and taking pecuniary actions are all different in some respect. Examining existing research on personal discount rates is one way to find variables that explain PFC. While they are different concepts, both involve similar internalized frameworks.

Personal discount rates are equivalent to an internal rate of return that individuals are willing, on average, to either pay on debt or collect on investments. Personal attributes can affect personal discount rates through their influence on inter-temporal preferences for gratification. One such example involves short-term discount rates in borrowing and expanding consumption through credit-card use. Persons with more education may better understand the implications of credit and the adverse effects of mortgaging future consumption for immediate gratification.[25]

This need for gratification is hypothesized as an integral component affecting PFC. If individuals are not gratified by a particular life experience, such as occupational specialty assigned at enlistment, they may compensate for this by taking on more personal debt through credit. Unwise use of credit leads to elevated debt, which affects one's perceptions of overall financial condition.

25 J. T. Warner, S. Pleeter, "The Personal Discount Rate: Evidence from Military Downsizing Programs," The American Economic Review, Vol. 91, No. 1, 37.

Research by Buddin and Do on the characteristics of enlisted personnel contacted by creditors or paying bills late can also help to explain perceptions about PFC. Buddin and Do found that education and a service member's dependency status were key characteristics.[26] Other possible explanatory variables were selected for the present study based on their direct impact on household net cash flow, relevance to upbringing, or other characteristics unique to military service (such as certain demographic factors). Variables that were of particular interest included: housing type, satisfaction with occupational specialty at time of enlistment, and time away from homeport.

B. MULTIVARIATE STATISTICAL MODEL

1. Specifying the Model

The dependent variable was defined in the *1999 DoD Survey of Active Duty Personnel* (ADS) by five different tiers. The ordinal logistic model consolidated these into three tiers. The ordinal dependent variable, "PFC," was defined as worst tier for responses of "in over head" or "tough making ends meet"; middle tier for "occasional difficulties making ends meet"; and best tier for responses of "meets ends without much difficulty" or "comfortable and secure."

26 R. Buddin, D. Phuong Do, 20, 42.

Independent variables selected for the present study represent both demographic and attitudinal characteristics. The independent variables were chosen based on demographic and attitudinal characteristics assumed to be explanatory for PFC.

Marital status was expected to affect a service member's PFC. Spousal employment and education were also among characteristics that might help to explain variations in PFC. The following two marital status models were therefore created to address these independent variables and their contributions, while improving model specificity:

$$PFC_{married} = f(\text{Race/Ethnicity; Paygrade; Gender; Satisfaction\_With\_Occupation; Spouse\_Education; Spouse\_Employment; Member\_Education; Age; Housing; Dependents; Time\_Away\_Homeport; Income; Savings; Unsecured\_Debt})$$

$$PFC_{single} = f(\text{Race/Ethnicity; Paygrade; Gender; Satisfaction\_With\_Occupation; Member\_Education; Age; Housing; Dependents; Time\_Away\_Homeport; Income; Savings; Unsecured\_Debt})$$

Race/ethnicity included black, Hispanic, white, and "other race." The paygrade variable included enlisted grades E1 to E3, E4 to E6, and E7 to E9. Satisfaction with occupation was a "yes/no/indifferent" response based on a member's current (at time of survey) satisfaction with the occupation assigned when first entering active duty.

Spousal and service member education levels included: non-high school graduate; high school or equivalent graduate; some college; Associate's degree; and at least a Bachelor's degree. Age was the only continuous variable and was bounded by the ages of 18 years and "49 years and over." This continuous variable was collapsed into the

following four groups: less than 20 years of age, between 19 and 30 years, between 29 and 39 years, and over 39 years old.

The housing variable categorized the service member's current housing arrangement as follows: military housing, personally-owned housing, barracks, or aboardship. The married model only included housing arrangements of military housing and civilian housing. Housing arrangements of aboardship and barracks were not included in the married model since they indicated that a member was living alone and possibly a geographical bachelor. Including these categories would have reduced the accuracy of specifying traditional marital housing arrangements, which were of particular interest in the present study.

The dependents variable was divided into two categories based on marital status: "married with additional dependents" or "single with dependents." Time away from homeport included six possible categories with values ranging from none to 12 months.

Model variables of income, savings, and unsecured debt indicated end-of-month financial status, after the member had paid monthly bills. Income was defined as total household gross income. Savings was defined as total savings, ignoring any offsetting debt. Unsecured debt was defined as total household debt, excluding mortgages and car loans. These pecuniary variables were categorized by ranges of values as shown, along with other variable definitions, in Table 6.

Table 6. Definitions of Ordinal Logistic Regression (OLR) Independent Variables

Variable	**Definition**
Race/Ethnicity	Hispanic, black, white, and all other races classified as “other race”
Paygrade	E1-E3, E4-E6, or E7-E9
Gender	Male or female
Satisfaction_With_Occupation	Yes, no, or neither answer that determines if member was satisfied with occupational specialty assigned at enlistment
Member_Education	Non-high-school graduate, high school graduate/GED, some college, or Associates’ degree
Spouse_Education	Non-high school graduate, high school graduate/GED, some college, Associate’s degree, or Bachelor’s degree and above
Age	Originally a continuous variable starting at 18 years and ending at “49 and above.” Collapsed into four age brackets: (a)18-19, (b)20-29, (c)30-39, (d)40+
Housing	Living in military housing, civilian rental, civilian owned, military barracks, or aboardship
Dependents	(a) With dependents other than a spouse (b) Without dependents
Time_Away_Homeport	Times ranging from none to 12 months: (a) None; (b) < 1 month; (c) 1 – 3 months (d) 3 – 5 months; (e) 5 – 7 months; (g) 7 – 12 months
Income	Household total gross income: (a) $1-$2,000; (b) $2,001-$3,000; (c) $3,001-$4,000; (d) $4,001-$5,000; (e) $5,001-$6,000; (f) $6,001 and up
Savings	Net household savings: (a) $0 - $5,000; (b) $5,001-$10,000 (c) $10,001-$20,000; (d) $20,001-$50,000 (e) $50,001 and up
Unsecured_Debt	Total unsecured debt (a) None - $5,000; (b) $5,001-$10,000 (c) $10,001-$20,000; (d) $20,001 and up

(Source: 1999 DoD Survey of Active Duty Personnel)

2. Ordinal Logistic Regression

Ordinal logistic regression (OLR) was used since the dependent variable studied had five categories that represented ranking by seriousness of financial condition. The OLR model is mathematically represented in Figure 1 as a set of *J-1* equations.

$$\log\left(\frac{F_{ij}}{1-F_{ij}}\right)=\alpha_j+\beta x_i$$
$$j=1,\ldots,J-1$$
$$\beta x_i=\beta_1 x_{i1}+\ldots+\beta_k x_{ik}$$
$$Fij=\sum_{m=1}^{j} p_{im}$$

Figure 1. Ordinal Logistic Equation

(Source: Logistic Regression Using the SAS System: Theory and Application, 138)

The variable F_{ij} represents the cumulative probability for individual "i" being in category "j" of the dependent variable. The β_{xi} represents the explanatory variables. A single function is used since multiple equation intercepts exist.

3. Hypothesized Relationships

Service members in minority racial/ethnic groups were expected to have higher PFCs than white service members. This hypothesis was based on the presumed effects of social and economic background. For example, black and Hispanic households, on average, have lower socioeconomic status

than do white households.[27] Black and Hispanic service members who grew up in households with generally lower socioeconomic conditions are presumed to benchmark their current financial status to their pre-service background. Accordingly, racial/ethnic minorities are considered more likely to perceive their active duty financial conditions in a positive light than are their white counterparts.

A service member's experience was expected to contribute directly to variations in PFC. As people age, they are expected to learn and adapt positively through education or other life experiences. As people are promoted, they are expected to have met higher standards of personal performance and experience. These experiences and improved levels of performance should include experience relevant to money management. Thus, higher levels of education and paygrade are expected to decrease the likelihood of being in the worst PFC tier.

A member's housing status was hypothesized to affect PFC in that simpler housing arrangements likely corresponded with more favorable PFC. Simple living conditions, such as barracks or aboardship, likely involved less personal expense in decorating or otherwise improving one's quarters. Lower housing-related expenses should lead to higher savings levels and improved PFC.

Financial explanatory variables were most directly related to PFC. Clearly, lower savings rates and higher unsecured debt should correspond with being in the worst PFC tier. Income rates were expected to contribute

27 P. D. McClain, A. K. Karnig, "Black and Hispanic Socioeconomic and Political Competition," The American Political Science Review, Vol. 84, No. 2, June 1990, 535-537.

directly to household savings and debt levels. However, the direct relationship was likely limited by individual variations in budgeting habits. It was expected that lower income levels would result in a service member's increased likelihood of being in the worst PFC tier.

Dependents were defined as household members, excluding spouse. Having dependents generally means higher monetary expenditures to meet additional household needs. Accordingly, higher expenditures were expected to decrease savings rates and increase the likelihood of being in the worst PFC tier. For the sake of this study, women are assumed to be better managers of their personal financial resources than are men. Accordingly, financial risks were expected to occur at higher frequencies among men. Thus, men were expected to have worse PFC levels as compared with women.

Specification of the theoretical model included references to consumption as it was related to gratification. It was expected that personnel satisfied with their occupational assignment assigned at enlistment would have a generally lower likelihood of sinking into debt. Personnel not satisfied with their occupation, or some other major aspect of their life, might conversely spend more to improve their life conditions, thereby increasing debt levels and the likelihood of being in the worst PFC tier.

Time away from homeport was expected to have a varying effect. Personnel who were single were expected to gain monetarily from time spent away from homeport. These monetary gains were expected because being at sea or in

some other training status precluded normal consumption patterns. Consequently, single personnel were expected to have more favorable PFC levels as time away from homeport increased.

Married personnel have a family structure where others depend on them to accomplish shared household functions. Family members remaining behind would have to handle increased household burdens. These increased burdens would likely lead to higher expenditures on "convenience items/services" to offset these burdens. Accordingly, married personnel were expected to have their PFC level degrade as time away from homeport increased. Table 7 summarizes the hypothesized relationships between explanatory variables and PFC.

Table 7. Hypothesized Relationships, Dependent Variable Versus Independent Variables

Variable	**Hypothesized Relationship**
"Base Case"	Base case was: (a) White (b) E7 to E9 (c) Male (d) Neither satisfied nor dissatisfied (e) HSGD (f) Spouse HSGD (g) Over 39 years old (h) Owns primary residence (I) No dependents (j) No time away from homeport (k) $2,000 or less gross monthly income (l) $5,000 or less in savings (m) $5,000 or less in unsecured debt
Race/Ethnicity	Non-white service members will have higher PFCs
Paygrade	PFC improves as paygrade increases
Gender	Males have worse PFC levels.
Satisfaction_With_Occupation	Satisfied members will have a higher PFC than dissatisfied members.
Member_Education	PFC improves with higher levels of education
Spouse_Education	PFC improves with higher levels of spouse education
Age	PFC improves with age

Variable	Hypothesized Relationship
Housing	PFC higher for personnel living aboardship or barracks
Dependents	PFC higher for personnel with no dependents.
Time_Away_Homeport	PFC higher for single personnel with more time away from homeport. PFC lower for married personnel or those with dependents
Income	PFC improves as household gross income increases
Savings	PFC improves as household net savings increases
Unsecured_Debt	PFC degrades as household unsecured debt increases

(Source: 1*999 DoD Survey of Active Duty Personnel*)

C. CHAPTER SUMMARY

Two marital status models were created that used variables identified in Chapter II as statistically significant in explaining variations in PFC. A “single” marital status model was constructed with 24 explanatory variables. Next, a “married” marital status model was created with 25 explanatory variables. The principal difference between these two models was excluding the divorce variable, as well as the barracks and aboardship housing variables, from the married service member model. Finally, spousal employment and education dummy variables were created for the married service member model. Hypothesized relationships between PFC and the explanatory variables were provided. Results from these models are discussed in the next chapter.

IV. RESULTS OF MULTIVARIATE MODELS

A. OBJECTIVE

The preliminary analyses presented in Chapter II showed that significant variations exist in perceived financial condition (PFC) among enlisted Navy personnel for different demographic and attitudinal characteristics. However, these analyses did not adequately address the relative importance of each of these variables in explaining variations in PFC. Multivariate models were constructed to further study the effect of selected variables on PFC. This chapter presents the results of the multivariate analysis.

B. RESULTS OF "SINGLE" MARITAL STATUS MODEL

Of the 3,855 enlisted personnel in the data set, 3,671 provided valid survey responses for all explanatory variables. Thirty-six percent of this smaller sample were single service members. Table 8 presents model-fit statistics for the model of single enlisted personnel. The max-rescaled R-Square was 0.2448, indicating that 24.48 percent of the variation of the dependent variable was explained by the explanatory variables modeled. The Somer's D value was 0.478, which indicated that the model had a 47.8 percent better chance of predicting PFC than a random guess.

The relationships between the explanatory and dependent variables were tested to determine whether a global null hypothesis could be rejected in favor of an alternate hypothesis. Each hypothesis was defined as follows:

H_0: $\beta_1=\beta_2=. \ . \ .\beta_k=0$

H_1: At least one β not equal to zero.

Model regression analysis yielded an F-statistic with a p-value of <.0001 for the global null hypothesis test. Thus, at least one coefficient was not equal to zero and the null (H_0) hypothesis can be rejected in favor of the alternate hypothesis.

Table 8. Model Fit Characteristics of Single Marital Status Model

-2 Log L	**Max Rescaled R-Square**	**Somer's D**	**Likelihood Ratio**
Intercept (Int): 2592.179	0.2448	0.478	Chi-Square: 310.2683
Intercept & Covariates: 2281.911			DF: 24
			Pr>ChiSq: <0.0001

(Source: *1999 DoD Survey of Active Duty Personnel*)

Likelihood estimates for each explanatory variable did not readily convey the effect of the explanatory variables relative to the base case. Partial effects for likelihood of being in the worst, middle, or best PFC tiers were calculated. Results are presented with the likelihood estimate chi-square and p-values in Table 9. Partial effects represent the effect, relative to the base case individual, of a one-unit change in the explanatory variable on PFC.

Table 9. Partial Effects for Single Marital Status Model

Variable	Likelihood Worst PFC Tier	Likelihood Middle PFC Tier	Likelihood Best PFC Tier	Chi-Square	Pr > ChiSq
Base Case	0.155	0.319	0.527	N/A	N/A
E1_E3**	0.104	0.054	-0.159	4.0492	0.0221
E4_E6	0.033	0.025	-0.057	0.7122	0.1993
NHSGD	-0.012	-0.012	0.024	0.5148	0.2366
Some_college*	-0.037	-0.041	0.078	2.2693	0.0660
Assoc_deg	-0.015	-0.015	0.030	0.0205	0.4431
Teenager	0.009	0.007	-0.016	0.0259	0.4360
Twenty-something*	0.071	0.044	-0.115	1.8738	0.0855
Thirty-something*	0.071	0.044	-0.116	2.1172	0.0729
Divorced	0.017	0.014	-0.032	0.4502	0.2512
Female*	-0.025	-0.025	0.050	1.9474	0.0815
Black**	-0.041	-0.046	0.086	4.5051	0.0169
Hispanic*	-0.034	-0.037	0.070	2.1208	0.0727
Other_race**	-0.034	-0.037	0.071	2.8445	0.0459
Single_w_dependents**	0.046	0.033	-0.079	2.9404	0.0432
Barracks	-0.024	-0.025	0.049	1.4802	0.1119
Own Primary Residence	0.009	0.008	-0.017	0.1178	0.3657
Aboardship	-0.022	-0.022	0.043	0.9592	0.1637
Milhouse**	0.109	0.055	-0.164	4.4019	0.0180
Sat_w_occupation***	-0.060	-0.075	0.135	13.8893	0.0001
Unsat_w_occupation	0.013	0.011	-0.024	0.2993	0.2922
Time Away Homeport	0.003	0.003	-0.005	0.4393	0.2537
Income**	-0.008	-0.008	0.016	4.3668	0.0183
Savings***	-0.036	-0.039	0.074	94.4953	<0.0001
Unsecured_debt***	0.024	0.019	-0.044	43.2715	<0.0001

***, **, * Significant at one, five, and ten percent levels, respectively.

(Source: 1999 DoD Survey of Active Duty Personnel)

The general base case was introduced in Table 7. The "single" marital status base case was constructed to include the following characteristics: 1) white; 2) E7 to E9; 3) male; 4) neither satisfied nor dissatisfied with occupational specialty; 5) high school graduate; 6) over 39 years old; 7) off-base rental housing; 8) no dependents; 9) no time away from homeport; 10) household gross monthly income $2,000 or less; 11) household total savings $5,000 or less; and 12) total unsecured debt $5,000 or less. Increases and decreases in likelihood were all compared with this base case, whose probabilities of being in the worst, middle, and best PFC tiers were 0.16, 0.32, and 0.53, respectively. The partial effect for each variable was determined by holding all other independent variables constant.

Paygrade, education, and age all were statistically significant in explaining variation in PFC for single personnel. While paygrades E4 to E6 were not statistically significant, paygrades E1 to E3 were. Single enlisted personnel in paygrades E1 to E3 were 10.4 percent more likely than the base case (E7 to E9), to be in the worst PFC tier, which was composed of the two categories "in over head" and "tough making ends meet." This same group was 5.4 percent more likely than the base case to be in the middle tier for "occasional difficulties." Further, this group was 15.9 percent less likely than the base case to be in the best PFC tier, which was composed of the two categories "meets ends without much difficulty" and "comfortable and secure." Overall, the E1 to E3 paygrade variable was statistically significant at the 0.0221 level

and increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Education had a beneficial effect on PFC in the single model. While the variables “non-high school graduate” and “Associate’s degree” were not significant, the variable “some college” was. Single personnel with some college were 3.7 percent and 4.1 percent less likely than the base case (high-school graduate) to be in the worst and middle PFC tiers, respectively. Personnel with some college were 7.8 percent more likely than the base case to be in the best PFC tier. Overall, the “some college” variable was statistically significant at the 0.066 level and decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The variable “teenager” was not statistically significant. However, all other age variables were. Single personnel in their twenties were 7.1 percent and 4.4 percent more likely than the base case (forties and older) to be in the worst and middle PFC tiers, respectively. Single personnel in their twenties were 11.5 percent less likely than the base case of being in the best PFC tier. Overall, the “Twenty-something” variable was statistically significant at the 0.0855 level and increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Single personnel in their thirties were 7.1 percent and 4.4 percent more likely than the base case (forties and

older) to be in the worst and middle PFC tiers, respectively. Single personnel in their thirties were 11.6 percent less likely than the base case to be in the best PFC tier. Overall, the "Thirty-something" variable was statistically significant at the 0.0729 level and increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Race/ethnicity and gender were statistically significant in explaining variation in the dependent variable for single personnel. Single blacks were 4.1 percent and 4.6 percent less likely than the base case (white) to be in the worst and middle PFC tiers, respectively. Single blacks were 8.6 percent more likely than the base case to be in the best PFC tier. Hispanics were 3.4 percent and 3.7 percent less likely than the base case to be in the worst and middle PFC tiers, respectively. Hispanics were 7.0 percent more likely than the base case to be in the best PFC tier. Single personnel of "other races" were 3.4 percent and 3.7 percent less likely than the base case to be in the worst and middle PFC tiers, respectively. Single personnel of other races were 7.1 percent more likely than the base case to be in the best PFC tier. Overall, the black, Hispanic, and "other race" variables were statistically significant at the 0.0169, 0.0727, and 0.0459 levels, respectively. All of these variables decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypotheses, $H_{1,}$ for all three variables.

Single women were 2.5 percent less likely than the base case (male) to be in the worst or middle PFC tiers. Single women were 5.0 percent more likely than the base case of being in the best PFC tier. Overall, the “female” gender variable was statistically significant at the 0.0815 level and decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The divorced marital status variable was not statistically significant. However, the dependency status variable was. Personnel who were single and with one or more dependents were 4.6 percent and 3.3 percent more likely than the base case (no dependents) to be in the worst and middle PFC tiers. These personnel were 7.9 percent less likely than the base case to be in the best PFC tier. Overall, the dependent(s) variable was statistically significant for single service members at the 0.0432 level. This variable increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Housing arrangements of barracks, personally-owned housing and aboardship were not significant. The military housing variable was significant in explaining variations in PFC. Single personnel living in military housing were 10.9 percent and 5.5 percent more likely than the base case (off base rental housing) to be in the worst and middle PFC tiers, respectively. Single personnel living in military housing were 16.4 percent less likely than the base case to be in the best PFC tier. This explanatory variable was

statistically significant at the 0.018 level and was the explanatory variable with the most severe consequences on PFC. This variable significantly increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The dissatisfied-with-occupation variable was not statistically significant. However, the satisfied-with-occupation variable was statistically significant. Satisfaction with occupation assigned at enlistment was an important determinant of PFC for single service members. Personnel reporting satisfaction with their occupation were 6.0 percent and 7.5 percent less likely than the base case (neither satisfied nor dissatisfied) to be in the worst and middle PFC tiers, respectively. Further, these personnel were 13.5 percent more likely than the base case to be in the best PFC tier. The satisfied-with-occupation variable was statistically significant at the 0.0001 level. This variable decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The time-away-from-homeport variable was not statistically significant for single personnel. Prior analysis in Chapter II suggested a semi-sinusoidal relationship, and emphasized a hypothesized beneficial relationship.

The household gross monthly income scale is: 1) $1-$2,000; 2) $2,001-$3,000; 3) $3,001-$4,000; 4) $4,001-$5,000; 5) $5,001-$6,000; and 6) $6,001 and up. An increase in the household gross monthly income scale of one

unit decreased the likelihood of being in the worst and middle PFC tiers by 0.8 percent. A one unit increase in the household gross income scale increased the likelihood of being in the best PFC tier by 1.6 percent. The household gross monthly income variable was statistically significant at the 0.0183 level. Increases in household gross monthly income decreased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The household savings scale is: 1) $0-$5,000; 2) $5,001-$10,000; 3) $10,001-$20,000; 4) $20,001-$50,000; and 5) $50,001 and up. An increase of one unit on the total household savings scale decreased the likelihood of being in the worst and middle PFC tiers by 3.6 percent and 3.9 percent, respectively, for each increase. A one unit increase in the household net savings scale increased the likelihood of being in the best PFC tier by 7.4 percent. The total household savings variable is statistically significant at all levels. Increases in household savings decreased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The total unsecured debt scale was: 1) $0-$5,000; 2) $5,001-$10,000; 3) $10,001-$20,000; and 4) $20,001 and up. An increase of one unit on the total unsecured debt scale increased the likelihood of being in the worst and middle PFC tiers by 2.4 percent and 1.9 percent, respectively, for each increase. An increase of one unit on the total unsecured debt scale decreased the likelihood of being in the best PFC tier by 4.4 percent. The total unsecured debt

variable was statistically significant at all levels. Increases in total unsecured debt increased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

C. RESULTS OF "MARRIED" MARITAL STATUS MODEL

Of the 3,855 enlisted personnel in the data set, 2,362 were married and provided valid survey responses for all explanatory variables. Table 10 presents model fit statistics for the model of married enlisted personnel. The max-rescaled R-Square was 0.2901, indicating that 29.01 percent of the variation of the dependent variable was explained by the explanatory variables modeled. The Somer's D value was 0.507, which indicated that the model had a 50.7 percent better chance of predicting PFC than a random guess.

The relationships between the explanatory and dependent variables were tested to determine whether a global null hypothesis could be rejected in favor of an alternate hypothesis. Each hypothesis was defined as follows:

H_0: $\beta_2=\beta_3=. \ . \ .\beta_k=0$

H_1: At least one β not equal to zero.

Model regression analysis yielded an F statistic with a p-value of <.0001 for the global null hypothesis test. Thus, at least one coefficient was not equal to zero and the null (H_0) hypothesis can be rejected in favor of the alternate hypothesis.

Table 10. Model Fit Characteristics of Married Marital Status Model

-2 Log L	**Max Rescaled R-Square**	**Somer's D**	**Likelihood Ratio**
Intercept (Int): 4923.966	0.2901	0.507	Chi-Square: 692.1252
Intercept & Covariates: 4231.841			DF: 25
			Pr>ChiSq: <0.0001

(Source: *1999 DoD Survey of Active Duty Personnel*)

Likelihood estimates for each explanatory variable did not readily convey the effect of the explanatory variables relative to the base case. Partial effects for likelihood of being in the worst, middle, or best PFC tiers were calculated. Results are presented with the likelihood estimate chi-square and p-values in Table 11. Partial effects represent the effect, relative to the base case individual, of a one-unit change in the explanatory variable on PFC.

Table 11. Partial Effects for Married Marital Status Model

Variable	Likelihood Worst PFC Tier	Likelihood Middle PFC Tier	Likelihood Best PFC Tier	Chi-Square	Pr > ChiSq
Base Case	0.225	0.391	0.384	N/A	N/A
E1_E3***	0.174	-0.004	-0.170	12.0566	0.0003
E4_E6***	0.060	0.012	-0.072	7.0351	0.0040
NHSGD	-0.020	-0.009	0.029	1.4420	0.1149
Some_college	-0.006	-0.002	0.008	0.0703	0.3955
Assoc_deg	-0.065	-0.038	0.103	0.9153	0.1694
Teenager	-0.041	-0.020	0.061	0.3624	0.2736
Twenty-something	-0.021	-0.009	0.030	0.6247	0.2147
Thirty-something*	-0.036	-0.017	0.054	2.6052	0.0533
Female	-0.022	-0.009	0.031	0.7900	0.1871
Black	-0.015	-0.006	0.021	0.5121	0.2371
Hispanic***	-0.074	-0.046	0.120	10.5716	0.0006
Other_race	-0.024	-0.010	0.035	1.2751	0.1294
Own Primary Residence**	0.032	0.009	-0.041	2.7229	0.0495
Milhouse	-0.009	-0.003	0.012	0.2412	0.3117
Sat_w_occupation**	-0.035	-0.017	0.052	3.6429	0.0282
Unsat_w_occupation***	0.076	0.012	-0.089	8.1589	0.0022
Time Away Homeport*	0.006	0.002	-0.008	2.2420	0.0672
Income***	-0.016	-0.006	0.022	16.2317	<0.0001
Savings***	-0.046	-0.024	0.070	214.2758	<0.0001
Unsecured_debt***	0.026	0.007	-0.033	91.7557	<0.0001
Spouse employed***	-0.071	-0.043	0.114	25.6134	<0.0001
Spouse non high school grad	0.015	0.005	-0.020	0.8654	0.1761
Spouse w/ Associates Degree	-0.027	-0.012	0.040	1.2892	0.1281
Spouse w/ at least Bachelors	-0.033	-0.016	0.049	0.3863	0.2671
Married with dependents***	0.087	0.012	-0.099	17.5488	<0.0001

***, **, * Significant at one, five, and ten percent levels, respectively

(Source: 1999 DoD Survey of Active Duty Personnel)

The general base case was introduced in Table 7. The "married" marital status base case was constructed to include the following characteristics: 1) white; 2) E7 to E9; 3) male; 4) neither satisfied nor dissatisfied with occupational specialty; 5) high school graduate; 6) over 39 years old; 7) off-base rental housing; 8) no dependents; 9) no time away from homeport; 10) spouse is high school graduate; 11) spouse not employed; 12) household gross monthly income $2,000 or less; 13) household total savings $5,000 or less; and 14) total unsecured debt $5,000 or less. Increases and decreases in likelihood were all compared to this base case, whose probabilities of being in the worst, middle, and best PFC tiers were 0.23, 0.39, and 0.38, respectively. The partial effect for each variable was determined by holding all other independent variables constant.

Paygrade and age both are experience-based variables that help to explain variation in PFC for married service members. Married personnel in paygrades E1 to E3 were 17.4 percent more likely than the base case (E7 to E9) to be in the worst PFC tier, which was composed of the two categories "in over head" and "tough making ends meet." This same group was 0.4 percent less likely than the base case to be in the middle tier for "occasional difficulties." At the same time, this group was 17.0 percent less likely than the base case to be in the best PFC tier, which was composed of the two categories "meets ends without much difficulty" and "comfortable and secure." Overall, the E1 to E3 paygrade variable was statistically significant at the 0.0003 level and increased the

likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Married enlisted personnel in paygrades E4 to E6 were 6.0 percent and 1.2 percent more likely than the base case (E7 to E9) to be in the worst and middle PFC tiers, respectively. This group was also 7.2 percent less likely than the base case to be in the best PFC tier. Overall, the E4 to E6 paygrade variable was statistically significant at the 0.0040 level and increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

No statistically significant education variables were found for either service members or spouses in the "married" model. Preliminary analysis in Chapter II indicated a curvilinear relationship, emphasizing improved PFC levels with increased levels of education. Additionally, gender was not a statistically significant variable in the "married" model. Previous assumptions (Chapter II) were that women would have better PFC levels.

Among the age variables, only the "thirty-something" variable was statistically significant for the married model. The "teenager" and "twenty-something" variables were not significant. Married personnel who were in their thirties were 3.6 and 1.7 percent less likely than the base case (forties and older) to be in the worst and middle PFC tiers, respectively. Married personnel in their thirties were 5.4 percent more likely than the base case to be in the best PFC tier. Overall, the "thirty-something"

variable was statistically significant at the 0.0533 level and decreased the likelihood, relative to the base case, of being in an adverse PFC tier. This conflicts with the previously hypothesized relationship. Pearson correlation tests indicated that the “thirty-something” variable was collinear with other variables. Additionally, the “thirty-something” variable had a proportionally large standard error. Thus, the null hypothesis, $H_{0,}$ cannot be rejected. Another possible explanation is that married personnel in their thirties are further from retirement age, compared with base case. Proximity to retirement age may be significant in that these personnel perceive future reductions in wages as imminent (shift to retirement pension), and see an increased likelihood of future financial problems.

The black and “other race” variables were not statistically significant. However, the Hispanic race/ethnicity characteristic was statistically significant in explaining variation in the dependent variable PFC. Married Hispanics were 7.4 percent and 4.6 percent less likely than the base case (white) to be in the worst and middle PFC tiers, respectively. Hispanics were 12.0 percent more likely than the base case to be in the best PFC tier. Overall, the Hispanic variable was statistically significant at the 0.0006 level and decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The personally-owned-housing variable was significant in explaining variations in PFC. However, the military

housing variable was not. Married personnel living in personally-owned housing were 3.2 percent and 0.9 percent more likely than the base case (off-base rental housing) to be in the worst and middle PFC tiers, respectively. Married service members living in personally-owned housing were 4.1 percent less likely than the base case to be in the best PFC tier. This explanatory variable was statistically significant at the 0.0495 level and increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The satisfied-with-occupation variable explained variation in PFC to a negligible extent. Married personnel reporting satisfaction with their occupation were 3.5 percent and 1.7 percent less likely than the base case (neither satisfied nor dissatisfied) to be in the worst and middle PFC tiers, respectively. Satisfied personnel were 5.2 percent more likely than the base case to be in the best PFC tier. The satisfied-with-occupation variable was statistically significant at the 0.0282 level. This variable decreased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Dissatisfaction with occupation assigned at enlistment was an important determinant of PFC. Married personnel reporting dissatisfaction with their occupation were 7.6 percent and 1.2 percent more likely than the base case (neither satisfied nor dissatisfied) to be in the worst and middle PFC tiers, respectively. Dissatisfied personnel were 8.9 percent less likely than the base case to be in

the best PFC tier. The dissatisfied-with-occupation variable was statistically significant at the 0.0022 level. This variable increased the likelihood, relative to the base case, of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Married personnel reporting employed spouses were 7.1 percent and 4.3 percent less likely, relative to the base case (spouse not employed), of being in the worst and middle PFC tiers, respectively. These married personnel were 11.4 percent more likely, relative to the base case, to be in the best PFC tier. The “spouse employed” variable was statistically significant at all levels and decreased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Married personnel with dependents were 8.7 percent and 1.2 percent more likely, relative to the base case (no dependents), of being in the worst and middle PFC tiers, respectively. These married personnel were 9.9 percent less likely than the base case to be in the best PFC tier. The “married-with-dependents” variable was statistically significant at all levels and increased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Values for the time-away-from-homeport variable were: 1) none; 2) < 1 month; 3) 1-3 months; 4) 3-5 months; 5) 5-7 months; and 6) 7-12 months. The “time-away-from-homeport” variable was statistically significant at the 0.0672 level in the “married” model. Each incremental increase in time away increased the likelihood of being in the worst and middle tiers PFC tiers by 0.6 percent and 0.2 percent,

respectively. Each incremental increase in time away from homeport decreased the likelihood of being in the best PFC tier by 0.8 percent. This variable increased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

Household gross monthly income, total savings, and total unsecured debt were all statistically significant. The household gross monthly income scale was: 1) $1-$2,000; 2) $2,001-$3,000; 3) $3,001-$4,000; 4) $4,001-$5,000; 5) $5,001-$6,000; and 6) $6,001 and up. A one unit increase in household gross monthly income decreased the likelihood of being in the worst and middle PFC tiers by 1.6 percent and 0.6 percent, respectively. An increase of one unit in the household gross income scale increased the likelihood of being in the best PFC tier by 2.2 percent for each increase. The household gross monthly income variable was statistically significant at all levels. Increases in household gross monthly income decreased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The household savings scale was: 1) $0-$5,000; 2) $5,001-$10,000; 3) $10,001-$20,000; 4) $20,001-$50,000; and 5) $50,001 and up. An increase of one unit on the total household savings scale decreased the likelihood of being in the worst and middle PFC tiers by 4.6 percent and 2.4 percent, respectively. An increase of one unit on the household net savings scale increased the likelihood of being in the best PFC tier by 7.0 percent. The total household savings variable was statistically significant at all levels. Increases in total household savings decreased

the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

The total unsecured debt scale was: 1) $0-$5,000; 2) $5,001-$10,000; 3) $10,001-$20,000; and 4) $20,001 and up. An increase of one unit on the total unsecured debt scale increased the likelihood of being in the worst and middle PFC tiers by 2.6 percent and 0.7 percent, respectively. A one unit increase on the total unsecured debt scale decreased the likelihood of being in the best PFC tier by 3.3 percent. The total unsecured debt variable was statistically significant at all levels. Increases in total unsecured debt increased the likelihood of being in an adverse PFC tier. Thus, H_0 can be rejected in favor of the alternate hypothesis, H_1.

D. CHAPTER SUMMARY

The analysis in this chapter seeks to identify characteristics that are statistically significant in explaining variations in PFC. Tables 12 and 13 show the variables that have the most beneficial and adverse effects, respectively. The following chapter provides a further summary and conclusions, as well as recommendations for continuing research related to PFC.

Table 12. Summary of Significant Variables Ranked by Level of Beneficial Partial Effect on PFC (<0.1 Significance Level)

Single Model Variables (% Lower Likelihood of Being in Worst PFC Tier, Relative Base Case)	**Married Model Variables (% Lower Likelihood of Being in Worst PFC Tier, Relative Base Case)**
Satisfied w/ Occupation (6.0)	Hispanic (7.4)
Black (4.1)	Spouse Employed (7.1)
Some College (3.7)	Savings (4.6 per one unit increase)
Savings (3.6)	Thirties (3.6)
Other Race (3.4)	Satisfied w/ Occupation (3.5)
Hispanic (3.4)	Income (1.6 per one unit increase)
Female (2.5)	-
Income (0.8 per one unit increase)	-

(Source: *1999 DoD Survey of Active Duty Personnel*)

Table 13. Summary of Significant Variables Ranked by Level of Adverse Partial Effect on PFC (<0.1 Significance Level)

Single Model Variables (% Higher Likelihood of Being in Worst PFC Tier, Relative to Base Case)	**Married Model Variables (% Higher Likelihood of Being in Worst PFC Tier, Relative to Base Case)**
Military Housing (10.9)	E1 to E3 (17.4)
E1 to E3 (10.4)	Married w/ Dependents (8.7)
Thirties Age Bracket (7.1)	Dissatisfied w/ Occupation (7.6)
Twenties Age Bracket (7.1)	E4 to E6 (6.0)
Single w/ Dependents (4.6)	Own Primary Residence (3.2)
Unsecured Debt (2.4 per one unit increase)	Unsecured Debt (2.6 per one unit increase)
-	Time Away From Home Port (0.6 per one unit increase)

(Source: 1999 DoD Survey of Active Duty Personnel)

Principal differences between the “single” and “married” models included the effect of age, education, and time away from homeport. Single personnel in their thirties had a 7.1 percent higher likelihood of being in an adverse PFC tier. In contrast, Married personnel in their

thirties had a 3.6 percent lower likelihood of being in an adverse PFC tier. Education and “time away from homeport” were only significant in the single and married models, respectively.

There were many similarities between the married and single models. Personnel who were in paygrades E1 to E3 had some of the highest likelihoods of being in an adverse PFC tier in both models. Single and married personnel who were satisfied with their occupation were 6.0 percent and 3.5 percent less likely to be in an adverse PFC tier, respectively. Single personnel of Hispanic, black, or other non-white race/ethnicity were between 3.4 percent and 4.1 percent less likely than whites to be in an adverse PFC tier. Married Hispanics were 7.4 percent less likely than whites to be in an adverse PFC tier. Finally, the pecuniary variables of savings, income and debt affected PFC similarly in the married and single models.

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V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY AND CONCLUSIONS

The goal of this study was to identify demographic and attitudinal characteristics that affected the perceived financial condition (PFC) of enlisted personnel in the U.S. Navy. Data from the *1999 DoD Survey of Active Duty Personnel* (ADS) were used to construct and evaluate two ordinal logistic regression (OLR) models, representing separate analyses for married and single personnel. The models explained 24.5 percent and 29.0 percent of the variation in PFC for single and married personnel, respectively.

The OLR model consolidated the dependent variable into three tiers. The dependent variable, "PFC," was defined as worst tier for responses of "in over head" or "tough making ends meet"; middle tier for "occasional difficulties making ends meet"; and best tier for responses of "meets ends without much difficulty" or "comfortable and secure." To describe partial effects, a base case was constructed for a "single" marital status model, including the following characteristics: 1) white; 2) E7 to E9; 3) male; 4) neither satisfied nor dissatisfied with occupational specialty; 5) high school graduate; 6) over 39 years old; 7) off-base rental housing; 8) no dependents; 9) no time away from homeport; 10) household gross monthly income $2,000 or less; 11) household total savings $5,000 or less; and 12) total unsecured debt $5,000 or less. The "married"

marital status model included two additional characteristics: 1) spouse is high school graduate and 2) spouse not employed.

Model results for both the “single” and “married” models indicated better PFC outcomes for racial/ethnic minorities. Single, non-white personnel perceived their financial condition as better than the base case. Single blacks and Hispanics were 4.1 percent and 3.4 percent less likely than whites to be in the worst PFC tier, respectively. Single personnel of the “other-race” category were 3.4 percent less likely than whites to be in the worst PFC tier. Married Hispanics were 7.4 percent less likely than whites to be in the worst PFC tier. These results lend support to the hypothesis that childhood socioeconomic status might affect PFC in adulthood.

The “single” marital status model differed from the “married” model in the effects of paygrade, gender, and age. First, in the single model, only the “E1 to E3” paygrade variable was significant in explaining variations in PFC. That was, E1 to E3 personnel were 10.4 percent more likely to be in the worst PFC tier than were E7 to E9 personnel. Conversely, both the variables “E1 to E3” and “E4 to E6” proved significant in explaining variations in the PFC of married personnel. Married E1 to E3 personnel were 17.4 percent more likely to be in the worst PFC tier than were E7 to E9 personnel who were married. Married E4 to E6 personnel were 6.0 percent more likely to be in the worst PFC tier than were E7 to E9 personnel who were married.

Completion of some college courses, one year or less of college credit, was apparently beneficial to single personnel. Single personnel were 3.7 percent less likely than the base case (high school graduate) to be in the worst PFC tier after completing some college courses. Although different PFC distributions were observed, no other level of education was statistically significant in explaining variations of PFC in both the married and single models.

Gender was significant in explaining PFC only in the "single" marital status model. Single women were 2.5 percent less likely than their male counterparts to be in the worst PFC tier. This provides some support to the assumption that women are better managers of personal financial resources than are men.

Personnel were categorized within age brackets of teens, twenties, thirties, and forties or above. Generally, PFC improved with age. This suggests that personnel might gain improved financial management skills as they age and become more experienced in handling their money. In the "single" marital status model, personnel in their twenties and thirties were 7.1 percent more likely than personnel 40 years or older to be in the worst PFC tier. In the married model, only the thirties age category proved to be significant in explaining variations in PFC. Married personnel in their thirties were 3.6 percent less likely to be in the worst PFC tier than were older personnel.

Development of separate married and single models led to the determination that "time away from port" was statistically significantly in explaining the PFC of married personnel, while not significant in explaining PFC for single personnel. Married personnel serving away from home for more than seven of the past 12 months were 3 percent more likely than the base case (no time away) to be in the worst PFC tier.

Buddin and Do also found that military housing had no apparent financial benefit for junior enlisted personnel with less than 10 years of service. As Buddin and Do state:

> Financial problems are not more common for members in off-base housing than for those living on base. Various reasons can justify expanding or contracting the stock of on-base housing, but our result suggests that these policies will have little effect on the extent of financial problems.[28]

Preliminary analysis for a pooled model, including both married and single personnel, provided similar results for the effect of military housing on PFC. However, by expanding the analysis to separate models for single and married personnel, the effect of military housing on PFC became significant. Single personnel living in military housing, for example, were 10.9 percent more likely than the base case (civilian rental) to be in the worst PFC tier. It is important to note here that military housing for single personnel is unique; that is, military housing is typically reserved for single personnel who have children. In contrast, military housing results were not

28 R. Buddin, D. Phuong Do, xiv - xv.

statistically significant for married personnel. Finally, married personnel were 3.2 percent more likely to be in the worst PFC tier if they lived in personally-owned housing.

Finally, pecuniary variables of household gross monthly income, total savings, and total unsecured debt had the greatest statistical significance in explaining variations in PFC. (Specific household income, total savings, and unsecured debt intervals were defined in Table 6.) Income was the least valuable of the three variables in explaining PFC. Single and married personnel were 0.8 percent and 1.6 percent less likely to be in the worst PFC tier for each one unit increase on the scale measuring income. An increase of one unit on the unsecured debt scale increased the likelihood of being in the worst PFC tier by 2.4 percent and 2.6 percent for the single and married models, respectively. Incremental increases in the savings scale decreased the likelihood of being in the worst PFC tier by 3.6 percent and 4.6 percent for the single and married models, respectively. These results partially support the findings of Buddin and Do, who report that financial problems arise more often from spending patterns and money management skills than from income levels.[29]

B. RECOMMENDATIONS

The variable for “E4 to E6” and the variable for age in the thirties were both found to have significant adverse effects on PFC relative to the base case (E7 to E9 and age in the forties). Most DoD research has associated

[29] R. Buddin, D. Phuong Do, xv.

significant problems only with junior enlisted personnel. It is recommended that ensuing research include these more senior enlisted paygrades.

Although financial problems among senior enlisted personnel are less frequent, the impact on operational readiness is proportionately greater. Additionally, this would provide a better way to gauge whether senior enlisted personnel are qualified to act as financial counselors to junior enlisted personnel. Full appraisal of the financial conditions of senior enlisted personnel may also improve awareness of situations where they are not necessarily much better off than their more junior counterparts and need help as well.

Further study is recommended in using PFC to estimate the full costs of financial problems on force readiness. The Navy would get a more accurate picture of the effect of financial problems on readiness if PFCs were integrated into analysis of factors related to personal performance. Prior research on the costs of personal financial problems has not included analysis of PFCs. Costs to DoD are typically monetized by accounting for factors such as: processing garnishments, letter of indebtedness, revoking security clearance, and other administration actions. However, DoD does not quantify the potential stress associated with lower PFC levels among enlisted personnel. Individual concerns and stress may directly affect job performance, a members' health, and family relationships.[30]

30 R. Buddin, D. Phuong Do, Assessing Personal Financial Problems of Junior Enlisted Personnel, (Santa Monica, California: RAND, MR-1444-OSD, 2002), 11.

Further research should be conducted using the *2006 DoD Survey of Active Duty Personnel*. Hypotheses related to socioeconomic conditioning and the effects of gender on PFC call for more analysis. Additionally, the effects of military housing on PFC should be further studied. For example, this study found that single personnel living in military housing had a significantly higher likelihood of reporting a personal financial problem. Further research might help to identify personnel who could benefit most from military housing.

Further research should seek to refine the demographic and attitudinal profiles of personnel at the highest risk for adverse PFC levels. These improved profiles could assist command financial specialists and family center counselors in identifying personnel requiring assistance.

Finally, PFC models should be created with more specificity pertaining to education programs. For example, analysis of the Navy College Program, Montgomery GI Bill, and the Program for Afloat College Education (PACE) may prove beneficial in more accurately capturing the benefits of education on a sailor’s feeling of financial security and enthusiasm to remain in the Navy.

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